

APPLICANT(S): BARTLETT, Philip Nigel et al.

SERIAL NO.: 10/538,769

FILED: June 10, 2005

Page 5

### **REMARKS**

The present response is intended to be fully responsive to all points of objection and/or rejection raised by the Examiner and is believed to place the application in condition for allowance. Applicants assert that the present invention is new, non-obvious and useful. Prompt consideration and allowance of the claims is respectfully requested.

### **STATUS OF CLAIMS**

Claims 1-22 are pending in this application and have been rejected. Claims 1 and 11 have also been objected to.

Claims 1, 3 and 11 have been amended herein. Applicants state that the amendments to these claims add no new matter.

Claims 2, 5-6 and 13-14 are canceled herein without prejudice.

### **CLAIM OBJECTIONS**

In the final Office Action, the Examiner maintained his objection to claims 1 and 11 because the cross sectional area has been expressed in meters, instead of in its corresponding units of area, e.g.,  $m^2$ . The Examiner has accepted Applicants' explanation that "pore size" in the application as filed (at page 4, line 23) refers to "pore diameter" but has maintained the objection. In response, Applicants have amended claims 1 and 11 to refer to the pore diameter, and now request withdrawal of the objection.

### **CLAIM REJECTIONS**

#### **35 U.S.C. § 103 Rejections**

In the final Office Action, the Examiner maintained his rejection of claims 1-22 under 35 U.S.C. § 103(a), as being unpatentable over Bartlett et al. (PCT Patent Application Publication No. 99/00536) in view of Attard et al. (U.S. Patent No. 6,203,925). Applicants respectfully traverse this rejection.

Applicants note that independent claim 1 has been amended to recite that the positive electrode comprises a mesoporous structure having a periodic arrangement of substantially

APPLICANT(S): BARTLETT, Philip Nigel et al.

SERIAL NO.: 10/538,769

FILED: June 10, 2005

Page 6

uniformly sized pores with a diameter in the order of  $10^{-9}$  to  $10^{-8}$  m. Independent claim 1 has also been amended to incorporate limitations of claims 5 and 14 and to recite that "said mesoporous structure comprises a metal oxide, hydroxide or oxy-hydroxide is gold oxide, palladium oxide, nickel oxide (NiO), nickel hydroxide (Ni(OH)<sub>2</sub>), nickel oxy-hydroxide (NiOOH) or ruthenium oxide" and that "said negative electrode comprises a material that is carbon or palladium".

In the Response dated March 9, 2009, Applicants argued that Bartlett et al. discloses a method of preparing a porous film comprises electrodepositing material from a mixture onto a substrate and discloses that electrodes having a porous structure have a high surface area over which interaction and/or redox processes can occur (see, Bartlett et al., at page 1, lines 15-16). Applicants also argued that Bartlett et al. mentions a wide range of possible applications in very general terms (see, Bartlett et al., at paragraph bridging pages 1-2 and paragraph bridging pages 15-16) but does not mention power density or energy density.

Applicants further previously argued that the present invention is concerned with meeting the very special requirements of portable electronic devices that require both high power density and high energy density (see application as filed, page 1, last paragraph) and that the present inventors unexpectedly found that an electrode of the type disclosed in Bartlett et al., when used as the positive electrode in an electrochemical cell, provides the high power density and high energy density that is required by a portable electronic device.

The Examiner stated in the final Office Action that she was not persuaded by Applicants' arguments, because the claimed invention does not require meeting specific power or energy density limitations. The Examiner also stated that, since the cited references meet the limitations recited in the claimed invention, it would also be capable of providing the required power and energy density in the portable electronic device.

Applicants point out that the present claims do, in fact, require meeting specific power or energy density limitations, since the claims are limited to portable electronic devices, which necessarily require high energy density and high power density, as set forth in the application as filed, e.g., at page 1, lines 26-29.

The important point is that the present claims are directed to a portable electronic device that includes the defined mesoporous material in the positive electrode of an

APPLICANT(S): BARTLETT, Philip Nigel et al.

SERIAL NO.: 10/538,769

FILED: June 10, 2005

Page 7

electrochemical cell. The use of such mesoporous material in this application surprisingly provides a cell that meets the special requirements of portable electronic devices in terms of energy and power density. There is no disclosure in Bartlett et al. that would lead one of ordinary skill in the art to realize that mesoporous material as defined in the amended claims would be able to meet the special energy and power density requirements of a portable electronic device (in fact, there is no mention whatsoever of energy or power density). Applicants contend that the Examiner's suggestion to the contrary is based on hindsight.

The term "portable electronic device" (PED) is a well known term in the art. Appendix A attached hereto sets forth several definitions of this term as excerpted from several sources, as noted therein. It is clear from each of these sources, that a PED is essentially any electronic device that includes its own power source so that it can be used without permanent connection to a main electrical supply, such that it is able to be used anywhere (i.e., it is portable).

However, in order to be able to function reliably and for as long as possible without connection to a main electrical supply, while supporting a range of ever more power-intensive functionality, PEDs must clearly demand use of batteries that have the highest possible power and energy densities. The electrochemical cells according to the amended claims surprisingly provide the high energy and power densities that are necessary to power PEDs in a reliable and effective manner.

In addition, amended independent claim 1 now specifies the preferred electrode materials. By contrast, Bartlett et al. discusses electrochemical cells in vague terms only and does not disclose specific electrode combinations, such that the amended claims are clearly novel over Bartlett et al. Bartlett et al. does not even suggest that the disclosed materials could be used as electrode materials in the electrochemical cells of portable electronic devices (PEDs), and, in the absence of such disclosure, one of ordinary skill in the art would not think to use these materials in PEDs.

Attard et al. does not solve the deficiencies of Bartlett et al. For these reasons, the combination of Bartlett et al. and Attard do not render obvious amended independent claim 1.

Applicants note that claim 3 has been amended to clarify that "the mesoporous structure of the positive electrode additionally comprises a metal, wherein said metal oxide, metal hydroxide or metal oxy-hydroxide forms a surface layer over said metal and extends

APPLICANT(S): BARTLETT, Philip Nigel et al.

SERIAL NO.: 10/538,769

FILED: June 10, 2005

Page 8

over the pore surfaces". Claim 3, as amended, is not obvious over Bartlett et al. in view of Attard et al. and is allowable.

Claims 2, 5-6 and 13-14 have been canceled. Claim 3-4, 7-12 and 15-22 are dependent upon independent claim 1 and therefore include all the limitations thereof. The combination of Bartlett et al. and Attard et al., which does not render obvious independent claim 1, also does not render dependent claim 2-22 obvious.

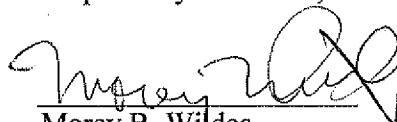
### Conclusion

In view of the foregoing amendments and remarks, Applicants assert that the pending claims are allowable. Their favorable reconsideration and allowance is respectfully requested.

Should the Examiner have any question or comment as to the form, content or entry of this Amendment, the Examiner is requested to contact the undersigned at the telephone number below. Similarly, if there are any further issues yet to be resolved to advance the prosecution of this application to issue, the Examiner is requested to telephone the undersigned counsel.

Please charge any fees associated with this paper to deposit account No. 50-3355.

Respectfully submitted,



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### **1) From United States Department of Agriculture**

<http://www.ocio.usda.gov/directives/doc/DM3550-003.pdf>

#### **Directive DM3550-003 (02/08/06) Portable Electronic Devices and Wireless Technology, Chapter 10, Part 3**

"A PED is any electronic device that is capable of receiving, storing or transmitting information using any format (i.e., radio, infrared, network or similar connections) without a permanent link to Federal networks. Handheld devices such as personal digital assistants (PDA) and cell phones allow remote users to synchronize personal databases and provide access to network services such as wireless e-mail, Web browsing, and Internet access. Moreover, these technologies can offer dramatic cost savings and new capabilities to diverse applications ranging from retail settings to manufacturing shop floors to first responders. Many of the serious security issues regarding PEDs stem from the manner in which they interact with other computer resources. Typically PEDs communicate wirelessly over limited distances to other devices within and outside USDA. Transmissions using these devices are unprotected, could spread malware to USDA and other networks or they could serve as a back channel through which vulnerabilities are exploited. Users could also use these devices to access a third party Internet Service Provider (ISP) and download applications in violations of security policy. Generally PEDs include but are not limited to: cell phones, pagers, text messaging devices (Blackberries), hand scanners, portable digital assistants, voice recorders, and flash memory. All of these devices can be used to transport data surreptitiously to be read/decoded at a later time."

### **2) From Air Safe web-site**

<http://www.airsafe.com/issues/ped.htm>

## **Advice on the Use of Portable Electronic Devices**

As the technology of personal entertainment and personal communications devices evolves, airline passengers have an ever increasing number of options in portable electronic devices such as MP3 players and web-capable cell phones. With these options come issues such as when a passenger can use these devices, and perhaps more importantly, when a passenger should show good judgement by not using these devices. As the ongoing debate over the use of cell phones in flight has shown, there are very strong opinions as to what kinds of activities and behaviors will be tolerated by other passengers.

### **3) From Airlines Web-Site**

<http://www.airlines.org/operationsandsafety/engineering/EMMC+Portable+Electronic+Devices.htm>

## **Portable Electronic Devices**

By Joe White  
Managing Director, Engineering & Maintenance  
Air Transport Association  
September, 2009

### **Background**

The proliferation of the use of portable electronic devices (PEDs) aboard aircraft in recent years (CD players, laptop computers, video games, cellular telephones, etc.) has prompted concern among aviation professionals about the effects such devices could have on the electronic systems aboard aircraft.

#### **4) From US Army Web-Site**

<http://www.arl.army.mil/www/DownloadedInternetPages/CurrentPages/VisitorInformation/ARLPEDVisitorInformationSheetv1.pdf>  
**US Army Research Laboratory Web-Site**

### **Army Research Laboratory (ARL) VISITOR INFORMATION SHEET Portable Electronic Devices (PED) within ARL**

#### **Purpose:**

This document is meant to inform visitors and guest researchers to ARL of the authorized use of PED's and removable media within ARL. This document should be distributed to all incoming visitors and guest researchers prior to their arrival to ensure they are familiar with the ARL PED policy.

#### **Definition:**

A PED is defined in Army Regulation (AR) 25-2 as portable Information Systems (IS) or devices with the capability of wireless or LAN connectivity. These include, but are not limited to: laptop computers with wireless capabilities, cellular/personal communication system devices, audio/video/data recording or playback devices, scanning devices, remote sensors, messaging devices, personal digital assistants (PDAs) (for example, Blackberries, Palm Pilots, Pocket PCs), and two-way radios. This policy addresses government and contractor PEDs issued and owned, as well as personally owned devices.

#### **5) UK Civil Aviation Authority**

<http://www.caa.co.uk/default.aspx?catid=1770&pagetype=90&pageid=9853>

## **Background Information**

The use of Portable Electronic Devices (PEDs) on board aircraft by flight crew, cabin

crew and passengers presents a source of uncontrolled electro-magnetic radiation with a risk of adverse interference effects to required aircraft systems.

All PEDs will radiate electro-magnetic radiation to a greater or lesser extent. To consider general examples, the EM radiation from a digital watch will be barely detectable, whereas the EM radiation from the motor of an old vacuum cleaner might be sufficient to interfere with other equipment in the home, such as a television. Such radiation is generally described as a "spurious emission".

A proportion of PEDs radiate electromagnetic energy intentionally, i.e. they transmit. These PEDs use this to provide a connection to other devices without the need for wires, and are often referred to as being "wireless". The amount of energy used in such a transmission depends on the distance over which the connection is intended to be made, with very low power levels being required for communicating over distances of up to a few metres, and higher power levels required for a few, or hundreds, of kilometres. Such transmissions are considered to be necessary to provide the desired functionality, and are generally described as "intentional transmissions".

PEDs therefore fall into one of two categories: those that emit spurious emissions only and those that also intentionally transmit.

The policy applied by UK airlines for the use of PEDs considers whether they are intentionally transmitting PEDs or not.

It is important to determine the PED policy of an airline if, as a passenger, you wish to use a PED during a flight. The policy may vary between airlines and it is important to acquaint yourself with the airline's policy when flying. This is briefed during the pre-flight safety briefing, and can often be found in airline literature onboard, or via the airline's website.

## **General Policy: Use of non-Transmitting PEDs**

Whilst the use of all PEDs is prohibited during the taxi, take-off and landing phases of flight, (when the passenger seat belt sign is on), use of PEDs that only produce spurious emissions are often permitted during the cruise phase of flight. However, the aircraft crew may require PED use to be suspended at any time, and such a request must be obeyed. Such a case might be if the crew suspects that the PED use is the cause of interference with aircraft systems.

Examples of PEDs that might be permitted to be used during the cruise phase of flight includes:

- laptop computers, PDAs and MP3 players (as long as they do not include wireless transmitting functions), and
- electronic games, DVD players, CD players, cassette players, video or "still"

cameras and calculators.

The use of some mobile phones or PDAs is also permitted by some airlines as long as they are used in the "flight safe" mode only, and this mode is enabled before the PED is turned off before the start of the flight, so that it is already within the "flight safe" mode when it is turned back on in the permitted phase of flight.

The restriction on the use of PEDs applies to devices carried onboard by the passenger or provided to the passenger by the crew. It does not apply to time measuring equipment (watches etc) or implanted medical devices (pacemakers etc). Any medical devices that include a monitoring feature that includes a transmitting function to a medical centre should have this transmitting feature switched off during the flight – see general policy on use of transmitting PEDs.

## **General Policy: Use of Transmitting PEDs**

The use of PEDs that intentionally transmit for the purposes of data transfer or vocal communication is generally prohibited for the duration of the flight. This is due to the level of EM Radiation generated during the communication process being greater than that caused by the PEDs' spurious emissions, which are normally tolerated.

Examples of intentionally transmitting PEDs that are generally prohibited are:

- mobile phones, personal computer equipment with wireless wide, local or personal area network (WWAN, WLAN or WPAN) devices, radio transmitters and remote control equipment (which may include some toys).

Some airlines may accept the use of low power devices conforming to the Bluetooth standard during the cruise phase of flight. The transmissions of these have been shown to be no greater than the host PED's spurious emissions.

Some aircraft are equipped with WiFi type Wireless Local Area Networks. In such cases, compatible devices may be used during the cruise phase of flight. Use is not permitted on aircraft not equipped with this feature.

Some aircraft are now equipped to enable mobile phones to be used. Details can be found in the section on Mobile phones. On all aircraft not equipped with these systems, use of mobile phones is prohibited for the entire duration of the flight.